VIT
Vellore Institute of Technology

School of Computer Science and Engineering

Fall Semester 2023-24 UG Seniors (B.Tech 2021 Batch)

Continuous Assessment Test – II

SLOT: D1+TD1, D2+TD2

Programme Name &Branch : B.Tech (CSE)

Course Name & code: Computer Networks & BCSE308L

Class Number (s): ALL

Exam Duration: 90 Min. **Answer ALL Questions** **Maximum Marks: 50**

1. a) Consider a scenario where Station A needs to transmit a message containing 10 frames to Station B using sliding window protocol. Set the sender's window size is 3. Assume, every 5th transmission is lost, while acknowledgments from the receiver for other transmissions are never lost. After every 5th transmission loss, the remaining frames within the window are sent to the receiver. Subsequently a timeout occurs. Draw the timing diagram and determine the total number of data transmission made by the sender (including retransmissions) if it follows:-

i. Go-back-N protocol **(3)**

ii. Selective repeat protocol **(3)**

Also, calculate the ratio of the effective number of frames sent to the total number of frames sent in each of the above cases.

b) A slotted ALOHA network transmits 800-bit frames using a shared channel with 400 kbps bandwidth. Find the throughput if the system (all stations together) produces **(4)**

i. 2000 frames per second

ii. 1000 frames per second

iii. 500 frames per second

Also find the vulnerability.

2. An ISP is granted a block of addresses starting with 188.50.0.0/16. The ISP wants to distribute these blocks to 100 customers as follows **(10)**

a. The first group has 30 medium-size businesses; each needs 128 addresses.

b. The second group has 50 small businesses; each needs 64 addresses.

c. The third group has 20 households; each needs 32 addresses.

Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.

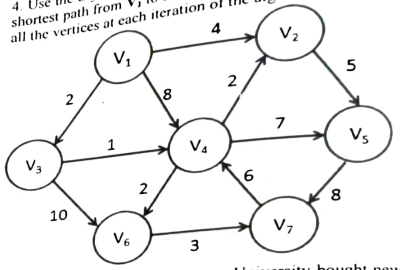
3. a) Discuss the differences between an IPv4 and IPv6 packet header (List any six) **(4)**

b) An IPv4 datagram has arrived with the following information in the header (in hexadecimal): **(6)**

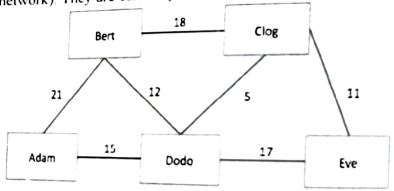
45 00 00 54 00 03 00 00 20 06 00 00 7C 4E 03 02 B4 0E 0F 02

i. Is the packet fragmented? Justify.
ii. What is the size of the data?
iii. How many routers thus the packet travel to? Justify.
iv. What is the identification number of the packet?
v. Give the offset value?
vi. Write the source IP address and Destination IP address

4. Use the Dijkstra's algorithm to solve the shortest path problem for the following graph. Find shortest path from V_1 to all other vertices. Draw a table showing the intermediate distance values of all the vertices at each iteration of the algorithm. **(10)**



5. The CSE department at Princeton University bought new Sun Fire V210 servers. They decided to run a distance-vector protocol for routing between these servers (even though it is a rather small network). They are currently configured as the picture below, with respective edge costs.



The CSE staff asked for your help. Write down each step of building the distance vector routing table for 'Eve'. You can use abbreviations e.g., 'A' for Adam and 'E' for Eve.

i. Show the initial routing table of server Eve. **(2)**
ii. Show the routing table of the server Eve after 1st and 2nd iteration of the algorithm. **(4)**
iii. Explain how a node transmits routing updates to its neighbors. **(2)**
iv. How the node/link failures are identified? **(2)**